Level 3 – 2003 PAAP Science and Technology Rubric and Scoring Guide

adapted from the Maine Assessment Portfolio (MAP) General Content Area Rubrics

1 Attempted Demonstration (little evidence)	*2* *Partial Demonstration* (some evidence)	*3* *Proficient Demonstration* (evidence meets standards)	*4* *Sophisticated Demonstration* (evidence exceeds standards)	Learning Results Content Standards and Performance Indicators
No demonstration of the content knowledge identified in targeted performance indicator.	Some demonstration of the content knowledge identified in targeted performance indicator.	Accurate, appropriate demonstration of content knowledge identified in targeted performance indicator including using the concept to describe, predict or explain; representing the concept in many ways; explaining the concept to someone else.	Exceeds expectations for demonstrating content knowledge identified in targeted performance indicator including using the concepts describe, predict or explain; representing the concept in many ways; explaining the concept to someone else.	***Students will be able to:*** ***<u>Classifying Life Forms</u> (A) – Understand that there are similarities within the diversity of all living things.*** **1. Compare systems of classifying organisms in different ways using different characteristics.** **2. Decipher the system for assigning a scientific name to every living thing.** **3. Describe some structural and behavioral adaptations that allow organisms to survive in a changing environment.**
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Contains little or no evidence of observation, investigation (asking questions and proposing strategies), data collection and analysis, drawing conclusions, or using results.	Contains some evidence of observation, investigation (asking questions and proposing strategies), data collection and analysis, drawing conclusions or using results.	Contains evidence of accurate, appropriate observation, investigation (asking questions and proposing strategies), data collection and analysis, drawing conclusions or using results.	Contains ample evidence of observation, investigation (asking questions and proposing strategies), data collection and analysis, drawing conclusions and/or using results with a degree of complexity or precision that exceeds expectations.	***Students will be able to:*** ***<u>Inquiry and Problem Solving</u> (J) – Apply inquiry and problem-solving approaches in science and technology.*** **1. Make accurate observations using appropriate tools and units of measure.** **2. Design and conduct scientific investigations which include controlled experiments and systematic observations.** **3. Verify and evaluate scientific investigations and use the results in a purposeful way.** **4. Compare and contrast the processes of scientific inquiry and the technological method.** **5. Explain how personal bias can affect observations.** **6. Design, construct, and test a device (invention) that solves a special problem.**

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Contains little or no evidence of observation, investigation (asking questions and proposing strategies), data collection and analysis, drawing conclusions, or using results.	Contains some evidence of observation, investigation (asking questions and proposing strategies), data collection and analysis, drawing conclusions or using results.	Contains evidence of accurate, appropriate observation, investigation (asking questions and proposing strategies), data collection and analysis, drawing conclusions or using results.	Contains ample evidence of observation, investigation (asking questions and proposing strategies), data collection and analysis, drawing conclusions and/or using results with a degree of complexity or precision that exceeds expectations.	***Students will be able to:*** ***<u>Inquiry and Problem Solving</u> (J) – Apply inquiry and problem-solving approaches in science and technology.*** **1. Make accurate observations using appropriate tools and units of measure.** **2. Verify, evaluate, and use results in a purposeful way. This includes analyzing and interpreting data, making predictions based on observed patterns, testing solutions against the original problem conditions, and formulating additional questions.** **3. Demonstrate the ability to use scientific inquiry and technological method with short term and long term investigations, recognizing that there is more than one way to solve a problem. Demonstrate knowledge of when to try different strategies.** **4. Design and construct a device to perform a specific function, then redesign for improvement (e.g., performance, cost).**

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Provides little or no explanation to support conclusions or findings.	Provides some explanation to support conclusions or findings.	Develops a reasonable explanation providing sufficient justification to support conclusions or findings, including a variety of evidence.	Develops a reasonable explanation providing ample justification to support conclusions or findings, including a variety of evidence and drawing on experiences and resources beyond the task itself.	***Students will be able to:*** ***<u>Scientific Reasoning</u> (K) – Learn to formulate and justify ideas and to make informed decisions.*** **1. Examine the ways people form generalizations.** **2. Identify exceptions to proposed generalizations.** **3. Identify basic informal fallacies in arguments.** **4. Analyze means of slanting information.** **5. Identify stereotypes.** **6. Support reasoning by using a variety of evidence.** **7. Show that proving a hypothesis false is easier than proving it true, and explain why.** **8. Construct logical arguments.** **9. Apply analogous reasoning.**

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Includes little or no scientific vocabulary, symbols or visual representation, and provides little or no descriptions of procedures and conclusions.	Includes some scientific vocabulary, symbols or visual representation, and/or provides some descriptions of procedures and conclusions.	Includes accurate, appropriate scientific vocabulary, symbols or visual representation, and provides a complete description of procedures and conclusions.	Includes accurate, appropriate use of sophisticated scientific vocabulary, symbols or visual representation, and provides an insightful, detailed description of procedures and conclusions.	***Students will be able to:*** ***Communication (L) – Communicate effectively in the application of science and technology.*** **1. Discuss scientific and technological ideas and make conjectures and convincing arguments.** **2. Ask clarifying and extending questions.** **3. Reflect on work in science and technology using such activities as discussions, journals, and self-assessment.** **4. Make and/or use sketches, tables, graphs, physical representations, and manipulatives to explain procedures and ideas.** **5. Gather and effectively present information, using a variety of media including computers (e.g., spreadsheets, word processing, programming, graphics, modeling).** **6. Cite examples of bias in information sources and question the validity of information from varied sources.** **7. Function effectively in groups within various assigned roles (e.g., reader, recorder).**

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1 *Attempted Demonstration* *(little evidence)*	*2* *Partial Demonstration* *(some evidence)*	*3* *Proficient Demonstration* *(evidence meets standards)*	*4* *Sophisticated Demonstration* *(evidence exceeds standards)*	Learning Results Content Standards and Performance Indicators
No demonstration of the content knowledge identified in targeted performance indicator.	Some demonstration of the content knowledge identified in targeted performance indicator.	Accurate, appropriate demonstration of content knowledge identified in targeted performance indicator including using the concept to describe, predict or explain; representing the concept in many ways; explaining the concept to someone else.	Exceeds expectations for demonstrating content knowledge identified in targeted performance indicator including using the concepts describe, predict or explain; representing the concept in many ways; explaining the concept to someone else.	***Students will be able to:*** ***<u>Implications for Science and Technology</u> (M) – Understand the historical, social, economic, environmental, and ethical implications of science and technology.*** **1. Research and evaluate the social and environmental impacts of scientific and technological developments.** **2. Describe the historical and cultural conditions at the time of an invention or discovery, and analyze the societal impacts of that invention.** **3. Discuss the ethical issues surrounding a specific scientific or technological development.** **4. Describe an individual's biological and other impacts on an environmental system.** **5. Identify factors that have caused some countries to become leaders in science and technology.** **6. Give examples of actions which may have expected or unexpected consequences that may be positive, negative, or both.** **7. Explain the connections between industry, natural resources, population, and economic development.** **8. Recognize scientific and technological contributions of diverse people including women, different ethnic groups, races, and physically disabled.**

Level 4 – 2003 PAAP Science and Technology Rubric and Scoring Guide

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